NON-BINDING ARBITRATION INITIATED 10/21/08
PURSUANT TO
DECREE OF MAY 19, 2003, 538 U.S. 720
KANSAS V. NEBRASKA & COLORADO
NO. 126, ORIG, U.S. SUPREME COURT

DEPOSITION OF DALE E. BOOK, P.E.,
produced, sworn, and examined on Monday, the 23rd day of February, 2009, between the hours of 8:00 o'clock in the forenoon and 6:00 o'clock in the afternoon of that day at Husch Blackwell Sanders LLP, 4801 Main Street, in the City of Kansas City, County of Jackson, State of Missouri, before:

JANE A. BLACKERBY, RPR, CCR
Registered Professional Reporter
of
JAY E. SUDDRETH & ASSOCIATES, INC.
Suite 100
10104 West 105th Street
Overland Park, Kansas 66212-5755

a Certified Court Reporter within and for the State of Missouri.

Taken on behalf of the State of Nebraska.

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Also Present:

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Mr. Samuel Speed
Mr. Christopher M. Gruenwald
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Mr. Thomas E. Riley, P.E.
Mr. Marc Groff, P.E.
Mr. Gordon R. Coke, P.E.
Mr. Marcus A. Powers
Mr. James R. Williams, P.E.
Mr. Justin D. Lavene

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EXHIBITS

DALE E. BOOK, P.E.,

of lawful age, having been first duly sworn to tell the truth, the whole truth, and nothing but the truth, testified as follows:

DIRECT EXAMINATION

BY MR. WILMOTH:

Q. Good morning, Mr. Book.

A. Good morning.

Q. How are you today?

A. I'm fine. Thank you.

Q. My name is Tom Wilmoth. I'm with the law firm of Husch Blackwell Sanders. I represent the state of Nebraska in this matter, as you may know. We're here today to take your deposition and to discuss with you a report entitled Engineering Analysis of Losses to Kansas Water Users Resulting from Overuse of Republican River Supply in Nebraska, 2005 and 2006, which I will go ahead and ask be marked as Exhibit 1 to the deposition.

(Whereupon, Book Deposition Exhibit Number 1 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) Mr. Book, are you familiar with that report?

A. Yes, I am.
Q. And are you the author of that report?
A. Yes, I am.
Q. Could we start briefly with your -- well, before we do that, let me ask you, is there any reason today that you would be impaired from testifying truthfully and accurately as to the questions that we're discussing today?
A. No.
Q. Okay. Not on any medication or anything like that that would impair your abilities?
A. No.
Q. Thank you. Can we start a little bit about your personal background? Could you explain your educational background to us, please?
A. Yes. I have a Bachelor's Degree in Civil Engineering from the University of Illinois, and I have a Master's Degree in Civil Engineering from Colorado State University.
Q. Okay. When did you receive those?
A. I received my undergraduate degree in 1976 and my graduate degree in 1980.
Q. Okay. And since that time what has your professional background been?
A. I am a consulting engineer in the fields of

water resources engineering and water rights engineering.

Q. And are you under contract to the state of Kansas currently?

A. Yes.

Q. And what is the scope of that service?

A. To provide consultation and assistance on the Republican River Compact matters.

Q. Okay. And you prepared this report as part of that scope of work?

A. Yes.

Q. All right. And how long have you been involved in that?

A. I have been working for the state of Kansas since the mid-1990s on Republican River matters, and specifically on this matter as it relates to this proceeding since about the end of 2007.

Q. And by this proceeding, do you mean this arbitration?

A. Yes.

Q. In preparation for this arbitration?

A. Yes.

Q. What other projects have you worked on for the state of Kansas?

A. I have worked on the Republican River

Compact matters, as I said, since the mid-1990s, which included the litigation in Kansas v. Nebraska. Assisted in the negotiation of the settlement, final settlement stipulation. I have also assisted the state of Kansas in the Arkansas River Compact.

Q. So do I correctly understand that you have worked in the Republican Basin and the Arkansas Basin?

A. Yes.

Q. Okay. Anything else for the state of Kansas?

A. No.

Q. With regard to Exhibit 1, the report, if you will forgive how silly this might sound, the Book report?

A. I have heard that before.

Q. I would imagine you have. We'll refer to it as the Book report. With regard to the Book report, Mr. Book, could you please explain the role that you played in producing that report?

A. I was the lead author on this report. I drafted the text and supervised the work that was done in support of this report and the conclusions.

Q. Okay. Whom did you supervise?

A. I had two staff in my office that were

assisting me in doing the analyses.

Q. And could you provide their names, please?

A. Yes. An engineer by the name of Josh Rice and a hydrogeologist named Angela Shank.

Q. Did you consult with anyone in developing the information that went into preparing the report?

A. Yes, I did.

Q. With whom did you consult?

A. I consulted with David Barfield, Scott Ross and David Pope.

Q. I'm sorry, before you proceed, could you identify those individuals for the record, generally who they are?

A. Scott Ross is the currently on the engineering committee for the Republican River Compact Administration and the water commissioner in the Stockton Field Office. David Pope is the previous chief engineer for the state of Kansas, and David Barfield is the current chief engineer as well as the Republican River Compact Administrator -- Commissioner, excuse me, for the state of Kansas.

Q. And with respect to each of those individuals, could you identify generally the

nature of your conversations?

A. Mr. Ross provided me background information on the system below the state line on the Republican River.

Q. Excuse me, do you mean the river system or the distribution systems, the irrigation distribution systems?

A. Both the river and the distribution system in the Bostwick Irrigation District and for water rights located on the Republican River downstream of the state line. Mr. Ross provided me with background information about the water rights and the general use of water in the Republican River in this reach. Mr. Pope provided me with information about the MDS administration and, again, general information about the use of water downstream on the Republican River and generally, about the impacts of reduced water supply to the state of Kansas water users.

Q. When you say impacts, are you referring to economic impacts or practical impacts?

A. I would be referring to water supply impacts.

Q. Would that include things like the substitution of groundwater for absent surface water?

A. Yes.

Q. For clarity sake, throughout the deposition I will refer to that substitution of absent surface water with groundwater as commingling. Are you familiar with that term?

A. Yes.

Q. Did you consult with anyone else within the state of Kansas to develop information in support of your report?

A. Yes. I had indicated I spoke also with Mr. Barfield. My discussions with him were related to compact accounting and the calculation of the CBCU and water supply for the compact administration accounting.

Q. I note that those individuals you reference are all either currently or past employees of the state of Kansas. Did you consult with anyone outside of the state of Kansas' employ?

A. I spoke with several economists.

Q. Could you name those individuals?

A. Bill Golden. A gentleman whose first name is Terry.

MR. DRAPER: Terry Kastens?

THE WITNESS: Terry Kastens, yes.

Q. (By Mr. Wilmoth) And what was the nature of your conversations with those individuals?

A. We discussed generally the water supply, conditions and operations in the Bostwick Irrigation District. They described to me what they needed for their analysis as input from our analysis and helped direct the focus of this report, specifically which values I needed to provide to them.

Q. And what values were those?

A. I calculated the amount of farm deliveries in the Bostwick Irrigation District and the amount of additional diversion on the Republican River and its tributaries downstream of the Bostwick Irrigation District.

Q. When you say additional diversion, do you mean diversions that might have been available if more water were in the system?

A. Yes.

Q. I believe I heard you say that you consulted with these two gentlemen, Mr. Golden and Mr. Kastens, about information related to KBID. That would be the Kansas Bostwick Irrigation District. Does that mean that you obtained information from them or you provided information

to them?

A. I provided information to them. I can't recall any information that I obtained from them.

Q. All right. Did you obtain any information from any other source in support of your report?

A. Information was provided to me by the Division of Water Resources through Scott Ross' office.

Q. Excuse me. Would that be the Kansas Division of Water Resources?

A. Yes.

Q. Are those all the individuals with whom you spoke concerning your report?

A. There were other economists involved in some of the discussions. I don't recall specific names.

Q. Were there any other individuals with whom you spoke from whom you obtained information in support of your report?

A. No.

Q. I'd like to speak to you about a couple of assumptions in the report, if I may. At this point it might be helpful to refer to the report itself. If I understand the report correctly, it assumes that Kansas was derived of 78,960 acre

feet of water in 2005 and 2006 combined. Is that an accurate understanding?

A. I think that's a generally accurate statement, depending on how you defined derived.

Q. How would you define it?

A. I would maybe distinguish between water consumed upstream of the state line which is charged to Kansas and water delivered to the state line. 78,960 is the total overuse by the state of Nebraska, not all of which would have reached the state line under compliance.

Q. And how much did you determine would have reached the state line? Under compliance, I believe was your phrase.

A. I have a table on Page 3 which shows my calculation of the net available state line supply.

Q. Could you please walk us through how you derive that calculation?

A. There were two deductions that I made. The first was for evaporation in Harlan County Reservoir, and the second was for the consumptive use of the canal loss which would occur between the diversion point on the river at Guide Rock and the state line in the Courtland Canal.

On the first calculation we made an estimate

of the additional amount of evaporation in Harlan County Reservoir that would have been associated with additional inflows to Harlan County Reservoir for the re-regulation to the state of Kansas through the Courtland Canal and deducted the entire amount.

For the second calculation we estimated the amount of transit loss that would occur between Guide Rock and the state line in delivering this allocation to the state line, and subtracted out the consumptive use part of that based on the fraction of the consumptive use of transit loss out of the Republican River Administration counting.

Q. Are there any stream gauges on the system above the state line that reflect actual flows in that system?

A. Yes. There would be a gauge at the state line in the canal, and there would be a gauge near the head gate of the canal and there would be a gauge at the dam.

Q. Excuse me. Is that Harlan County?

A. Yes. And there would be a gauge at the Guide Rock diversion, on the river.

Q. In calculating your canal losses and the consumptive use associated with that, did you look at any of those gauges and the data that they

show?

A. Yes. I looked at the state line gauge on the Courtland Canal.

Q. Is that the only gauge that you referenced?

A. Yes.

Q. When determining the losses in the system from Harlan County to the state line, if I understood you correctly, you estimated those. Is that correct?

A. I calculated the amount of the canal loss between the Guide Rock point of diversion and the Courtland Canal state line based on a relationship of the amount of loss that had historically been determined because it's measured on both ends of the -- that reach, and I believe it was on the order of 12 percent of the canal loss that historically occurred in that reach.

Q. Do you know how your calculations relate to the actual gauged flows?

A. Yes.

Q. Could you describe that relationship?

A. The numbers shown on the net available state line supply are additional flows in the canal at the state line above and beyond the historical flow for

these two years at the state line.

Q. Are we still referring to the table on Figure 3? I'm sorry, on Page 3?

A. Yes.

Q. All right. So, for example, if I'm correctly reading the table in 2005, you have got a net available state line supply of 40,600?

A. Yes.

Q. And that's in acre feet. Correct?

A. Yes.

Q. And my question to you at this point is, is the 40,600 acre foot number a calculated number or is that based on empirical gauged flows?

A. That is the calculated additional water at the -- available at the state line.

Q. So when determining your losses above the state line, does that number represent an actual loss of water in the system as reflected in the gauges within the system?

A. No, it doesn't.

Q. Do you have any idea what the actual loss number would be as reflected in the gauges?

A. Yes. The actual loss number, defining losses, the canal seepage and consumption of that would be the difference between the flow at Guide

Rock in the canal and the state line flow in the canal less any deliveries to Nebraska users along that reach of the canal.

Q. But that calculation was not made for purposes of the Book report. Is that right?

A. Not specifically for these two years. That's correct.

Q. Thank you. One of the things that we noticed in the Book report, or I should say we inferred from the Book report was that an adjustment was made with respect to the arbitrator's decision concerning non-federal reservoirs. Is that correct?

A. I'm not sure what you mean by adjustment.

Q. I would direct your attention to the middle paragraph on Page 1.

A. My recollection is that I was using the accounting that corresponded to the Kansas view on non-federal reservoir evaporation.

Q. So could you please read the second sentence of the second paragraph on Page 1.

A. "Figure for 2005 has been determined by the RRCA and confirmed by the ruling of the arbitrator with respect to the amount of non-federal reservoir evaporation."

Q. And what does that mean?
A. That we took the value -- that we took the value that had been agreed upon by the RRCA with the non-federal reservoir evap calculated in accordance with the Kansas position on that.
Q. Okay. And what is the meaning of the third sentence, the following sentence?
A. Just that there has not been an agreement reached through the RRCA about the allocation of evaporation for Harlan County Reservoir.
Q. And how does the report treat that allocation?
A. I calculated the evaporation for the existing water supply and split it as the state of Kansas had split that evaporation between the two states.
Q. Do you recall how that split broke down?
A. It was generally 50/50, but I don't remember the specific percentages.
Q. That's fine. Assume for the sake of this next question that the evaporation was to be allocated entirely to the state of Kansas in '05 and '06. How would that change the conclusions in your report, if at all?
A. I believe it would change the number

referred to in the second paragraph of the report regarding Nebraska's total overuse for the two years of 78,960. That would have an effect, then, on the final number of the additional water that was diverted on the farms to the Bostwick lands, as well as to the lands downstream of the Bostwick District. I don't believe it would change my general opinions about the available water supply, additional available water supply being divertable in the general proportions that I have calculated in this report.

Q. By proportions, do you mean the proportion of the final amount relative to the 78,960?

A. Yes.

Q. Thank you. So for sake of argument, if the 78,960 were reduced by 10 percent, you would expect a correlative 10 percent reduction in the final number?

A. I believe that's right. It wouldn't be exactly 10 percent, but it would be close. I need to add to that last answer I just gave you. If there was to be a change in how the evaporation is calculated and allocated to the two states, I believe I would also have to amend the approach that I used

to allocate the additional evaporation, which is shown on Table 3 under the column Additional HCR Evaporation.

Q. Okay. As you sit here today, do you have any opinion on the magnitude of that change?

A. No, I don't.

Q. I direct your attention to the final sentence in that same paragraph, second paragraph, Page 1. Could you explain to me the import of that sentence?

A. Are you referring to the sentence "In addition the 2006 number"?

Q. Yes, sir.

A. Yes. There were corrections to the RRCA accounting that I believe the state of Kansas noticed related to two details in the accounting for 2006. Since those -- since the figures for 2006 had not been agreed to through the RRCA, there was still some detailed problems, I guess you would call it, in the spreadsheet. One related to the evaporation rate on Swanson Reservoir. I don't recall what the other detail was.

Q. The evaporation rate on Swanson Reservoir affects the accounting in what way?

A. It affects the amount of CBCU for the state

of Nebraska, which affects the water supply, so it affects both the use and supply.

Q. Can you describe the nature of the error?

A. Generally, I believe a gross evaporation number was input to the spreadsheet instead of a net evaporation number.

Q. How was that error discovered?

A. I believe that somebody on the staff of Kansas Division of Water Resources may have identified that sometime between the time when these numbers were first submitted in December of '07 and when this report was done in January, '09.

Q. Can you describe the magnitude of change?

A. Yes. It was small.

Q. Do you have any recollection of the numbers?

A. No, I don't.

Q. Are both of these changes documented in the documentation for the spreadsheet that was used in your report?

A. I don't recall. They may not be.

Q. I'm sorry, there may not be?

A. They may not be documented. We may just

have made the changes and moved ahead.

Q. So with whom would I speak to determine the second change that was made? I believe you mentioned two. Evap on Swanson Reservoir and --

A. Yes. I may be the best person to talk to about that. I would just need to review.

Q. Is there anything with you today that you could review to refresh your recollection on that count? If you need five minutes, that would be fine with us.

A. I don't have anything with me right now.

Q. Do you have any recollection of the magnitude of the change that was made?

A. Again, it was small.

Q. And is this a change that also affected CBCU for Nebraska?

A. I don't recall.

Q. For the record, I'll ask you to define CBCU.

A. Computed beneficial consumptive use.

Q. Thank you. Are you aware of any other errors in the accounting spreadsheet that you might have discovered subsequent to preparation of your report?

A. No.

Q. I'd like to speak with you a little bit now about some assumptions that were made with regard to KBID and some operations within KBID. In your description of the KBID system on Page 3 of your report, could you read for the record the first sentence of the second paragraph under that heading?

A. During 2005 and 2006 not all of the service area in KBID received water due to severe water supply shortages.

Q. And what was the basis of that conclusion?

A. That the acreage that's reported in the annual reports of the Bostwick Irrigation District indicates the acreage that received water for each of those years, and that acreage was less than the normal acreage that receives water in normal water supply years.

Q. Okay.

A. As well as statements that were made to me from the people that I referenced earlier.

Q. These would be Mr. Barfield, Mr. Pope, Mr. Ross?

A. Yes.

Q. Did you speak with anyone from KBID

directly?

A. Not for the purposes of this study. I have spoken with the manager out there in years past, but not in preparation for this report.

Q. I'm going to hand you what I will ask be marked as Exhibit 2.

(Whereupon, Book Deposition Exhibit Number 2 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) Please take a moment, familiarize yourself with that document. Could you identify that document?

A. No, I can't.

Q. Do you see the date stamp at the top right-hand corner of that document?

A. Yes, I do.

Q. And what does it say?

A. "July 27th, 2006, received by the Kansas Department of Agriculture."

Q. And if you look at the top portion, there's a fax identification. Can you read what that says?

A. "From KS Bostwick Irrigation District" with a phone number.

Q. Thank you.

A. To the Stockton Field Office.

Q. And the title of this appears to be what?

A. It's titled "Above Lovewell operations, 2006 watering season."

Q. And I would direct your attention to the last sentence of the third full paragraph and ask that you read that for me, please.

A. "Combined with one really good rain and some additional showers, it looks as though we have helped our irrigators to be in position for a good harvest this fall."

Q. And if you could read the very last sentence of the document.

A. "The crops above Lovewell have all received a great benefit from the 4-inch delivered to the fields, and hopefully the rest of the summer will not take away too much of what we have been able to do to this point."

Q. My question relates to reconciling those statements which appear to come from the Kansas Bostwick Irrigation District with your conclusion that they experienced a severe water supply shortage in 2006. Do you have any opinion on how those statements can be reconciled?

A. Yes, I do. My conclusions are based on the data and the records of the District, and to whatever extent the Bureau of Reclamation helps with those records which indicate the amount of water that was received and the amount of acres that were irrigated. With respect to the first sentence, I think it's indicating that there was rain which would have helped the crops make the best of a situation that may or may not have been favorable to them with respect to normal water supplies, but certainly the rain was being viewed as a benefit.

With respect to the second sentence, I'm not sure exactly which fields received four inches of water, but I don't consider four inches of water to be a significant amount of water relative to the allocation that's normally available to the District, and again, I think the sentence in general is that the water that was available was of great benefit. That would always be the case when you're in a low water supply situation.

Q. I believe your statement was that four inches is not significant. In terms of measuring significance, does that mean yields, crop yields? What does significant mean to you?

A. I'm comparing the amount referenced in this

sentence with a normal delivery of somewhere between 12 and 15 inches for the District and just comparing those two numbers. So as a water supply, 4 inches would be low. On a seasonal basis for an individual run it's probably a normal run, but I don't know if this is a normal run he's describing or if this was for the season or some other duration.

Q. Okay. I'm going to hand you what will be Exhibit 3.

(Whereupon, Book Deposition Exhibit Number 3 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) I'll throw it at you. Bear with me. Please take a moment and review this document. When you have an opportunity, could you identify this document?

A. This appears to be a note or communication issued from Kenny Nelson of the District, the Bostwick Irrigation District, to the Bureau of Reclamation and also to the Division of Water Resources sometime late in the season of 2006 with a daily water report attached.

Q. And I would direct your attention to the last sentence of the paragraph under Message or Instructions. Could you read that sentence,

please?

A. "That 4-inch mark is going to be" -- you're referring to the following sentence?

Q. Yes.

A. "With the shot of river water we received pre-Harlan County and with this one we are now receiving post-Harlan County, we are producing a lot of additional bushels."

Q. I'd ask again with regard to the significance of the water, I understand that you are essentially comparing what you believe to be a full supply versus what was available in '05 and '06 and concluding that there was a significant shortage. Is that correct?

A. Yes.

Q. In terms of significance to the District, do you have an opinion on how significant that water was, if they were, quote, producing a lot of additional bushels?

A. I do not. Again, if you're on a very limited water supply, any additional water that you get at a key time of the year, I assume he is describing corn here, although that may not necessarily be the case, but if it's corn, then this would be a key time to have additional water.

Whatever water you had would be significant.

Q. So, for example, in July, how does four inches of water in July compare to your average condition?

A. That would probably be a little low. I would expect June and July to be the two largest months. Four inches seems like it would be a little lower than the normal supply for July.

Q. Any idea what that is, the normal supply?

A. Probably six inches, seven inches maybe.

Q. Let's talk a little bit about water stored in Harlan County Reservoir. Was there any water stored in Harlan County that KBID did not call for in 2006?

A. That's certainly possible. I'm not sure.

Q. How about 2005?

A. The same answer. It's possible, but I don't know.

Q. And if that water were available in Harlan County Lake but not called for, do you know why that might have been the case?

A. That would be because of operational issues. Either the water became available too late in the season to be helpful or the projections were such

that the crops that were planted and being irrigated were limited based on projections, or perhaps the system had been operating and it was determined that it would be a waste of water to run more water down the canal because of system losses. Those are three reasons I could think of.

Q. I'll hand you what will be Exhibit No. 4.

(Whereupon, Book Deposition Exhibit Number 4 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) Take a moment and look at that piece of correspondence for me. When you have had a moment, could you identify that document?

A. This appears to be a correspondence from the Kansas Water Office to the Bureau of Reclamation acknowledging Kansas being approved for assistance under the Title 1 of the Reclamation States Emergency Drought Relief Act of 1991, with a document attached to it entitled Drought Assistance, Kansas Republican and Solomon Irrigation Districts Increased Reservoir Storage Carryover, Harlan County Lake, Kirwin Reservoir and Webster Reservoir.

Q. And in the first page there's a bullet

point. Can you read that, please?

A. "Kansas Bostwick Irrigation District No. 2, Kirwin Irrigation District No. 1 and Webster Irrigation District No. 4 not call for 2005 irrigation season storage releases from Harlan County Lake, Kirwin Reservoir and Webster Reservoir."

Q. Do you have any understanding of whether the state of Kansas elected not to call for water from Harlan County in 2005?

A. No, I don't.

Q. Is that something you explored in your report?

A. No, I did not.

Q. Is it possible that the state did not call for water in 2005 from Harlan County?

A. I don't know. There's record of what was delivered to the District lands, so there was some water supply available. And I had mentioned three reasons before why it's possible they may have stopped calling, but it's possible.

Q. Are you familiar with the Reclamation States Emergency Drought Relief Act?

A. No.

Q. In certain places in your -- in the Book report you refer to KBID records as a source of

information and the Bureau data as a source of information. Can you generally tell us when you were looking at KBID data and when you were looking at Bureau data?

A. We looked at the Bureau data for the specific records of deliveries and losses. They record the amount of water delivered to the farms and they record both lateral losses, as well as main canal losses, which I understand to be tail water discharges that are measured. The reference to the KBID data relates to the information that they publish in their annual reports, which is primarily focused on total delivery for the system and the acreage served.

Q. Does the KBID data contain any information about yields, crop yields?

A. Yes, it does.

Q. And how did those yields in '05 and '06 relate to the prior, preceding ten years, say?

A. I don't know.

Q. Mr. Book, I'll hand you Exhibit 5.

(Whereupon, Book Deposition Exhibit Number 5 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) When you have had a

moment to look at that, could you identify that document, please?

A. This document is a letter from David Barfield, the chief engineer, to Dick Wolfe, the Colorado State Engineer in April of '08 to provide answers to a number of questions that I believe Mr. Wolfe had submitted.

Q. And what is Question No. 2 in this document?

A. This provides Kansas response on a question about the number of acres actually irrigated within KBID, and this provides tabulations for about ten years.

Q. And what is the figure for 2005?

A. 24,546 acres.

Q. And I would direct your attention to Page 3 of the Book report. What did you determine was the irrigated acreage volume in 2005?

A. Could you repeat the question?

Q. What did you determine in the Book report was the irrigated acreage number for 2005?

A. 23,400 acres.

Q. And so there appears to be a 1,100 acre discrepancy between the data that -- the Kansas Department of Agriculture report and your report?

A. Yes. I see that.
Q. Can you explain that discrepancy?
A. No, I cannot.
Q. If the information reported by KDA, Kansas Department of Agriculture, were correct and additional acreage were irrigated in 2005, how would that affect your report, if at all?
A. It really wouldn't.
Q. So the fact that additional acreage was actually irrigated would not necessarily mean that more water was received than you estimated?
A. No, it would not.
Q. And what would be the source of that additional water?
A. I'm sorry, I don't understand that question.
Q. Well, it appears that, to me, that between the KDA letter and your analysis, there's a 1,100 acre feet roughly unaccounted for. Sorry, acres roughly unaccounted for. Excuse me. My question is, if you're suggesting that that difference has nothing to do with the amount of water delivered, how would that additional irrigation have occurred?
A. I think the two data components are separate. There's records of deliveries of water

which are volumes of water and there's records of reported acreage, and I'm not sure what the source of the difference between these two numbers would be, but that, in my view, would not translate to a change in the volume of water. We're simply talking about a record of how many acres were irrigated in the KBID service area, so I don't see the direct connection between the water and the acreage.

Q. Okay. Fair enough. The Book report assumes that 2005 and 2006 irrigated acreage in KBID would have been essentially equivalent to the eight year average, '94 to 2001. Is that correct? Top of Page 5 of your report.

A. The exact quantification of acreage was not really important or a necessary part of our analysis. We're allocating water supply between losses, system losses and deliveries to the farm and economists developed their acreage number, so my reference to the acreage is to simply point out that a normal water supply and acreage would be at a level of the numbers I referred to here, both in terms of inches in acreage, and it turns out that the water supply that we calculated available to the farm would have translated to approximately those acreage amounts.

Q. So there is some correlation between

water supply and irrigated acreage?

A. Yes.

Q. How does that period 1994 to 2001 compare to what happened in '05 and '06 in terms of precipitation, cropping patterns, things like that?

A. I'm not sure with respect to precipitation. With respect to cropping patterns, I would expect that there's some difference between years when there's what I have been referring to as normal water supply and years when there are expected shortages.

Q. What did you assume in the Book report for efficiencies, irrigation efficiency?

A. We used the record to determine a relationship between the amount of water in the canal at the state line and the amount of losses or the efficiency in the canal system, which is a measure of the -- of the amount of water delivered to the farms over the total water supply. We developed that relationship as a function of the water supply for the canal losses and as a constant percentage for the lateral losses, and then applied that value to the total supply for the two years, '05 and '06 with the additional water included.

Q. And how do those efficiencies generally

relate to other systems in Kansas?

A. I don't really have a direct comparison that I have developed for that.

Q. Is there any actual efficiency data available from the Bureau or from KBID?

A. Yes. The data that are available for this system are fairly extensive because they document the amount of deliveries out of the canals. You have got measurements of water into the canal and measurements of the deliveries to the farm, so you can make an actual calculation of the efficiency.

Q. And you relied on that data to do so?

A. Yes.

(Whereupon, Book Deposition Exhibit Number 6 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) I'm going to hand you Exhibit 6. Would you take a moment to familiarize yourself with that document.

A. Yes.

Q. Could you identify generally that document for the record?

A. This is a letter dated September 11th, 2006 from the Kansas Water Office to the U.S. Bureau of Reclamation submitting to the Bureau proposed lake

level management plans for the coming water year 2007, and includes a graph which appears to be a projection for Lovewell Reservoir and a narrative for Lovewell Reservoir.

Q. Is this, to your knowledge, a regular practice, specifically the Kansas Water Office submitting these proposed levels?

A. It may be. I'm not sure.

Q. Is there a relationship between the elevation in Lovewell and the amount of water that can be taken by KBID below Lovewell?

A. I would expect that there probably is some minimum operating pool in Lovewell.

Q. Are you familiar with Lovewell operations generally?

A. Generally.

Q. Okay. Do you know how Lovewell is operated when it is above flood control storage?

A. My understanding is that there have been year to year authorizations granted by the court to allow storage, surcharge storage for some part of the season.

Q. Do you know how that works?

A. I believe that the Corps provides approval to invade the flood control space of Lovewell for --

by certain amount for a certain duration. I don't know the details of either of those.

Q. You don't know the amount or the duration?

A. No.

Q. Do you know whether or not there's any limit on that amount or duration?

A. I would expect that there would be on both.

Q. You don't know what that is, though?

A. No, I don't.

Q. As part of your analysis did you investigate whether or not such limitations were operational in '05 or '06?

A. No, I did not.

Q. So it's possible that irrigators below KBID would have been precluded from storing additional water due to flood control limitations?

A. Well, that's possible, if you were pushing up against your authorized limited.

Q. I'd like to transition out of KBID for a moment and talk to you a little bit about some of your analyses regarding the added stream flow below KBID.

A. Yes.

Q. Do you know what I'm referring to when I

say added stream flow?

A. Yes.

Q. Okay. These are the individuals below KBID who were determined to be -- have less water available to them?

A. Yes.

Q. Okay. If I understand your report correctly, you conclude that return flows below KBID are available downstream to these individuals. Hydrologically, how is that so?

A. Because of the location of the reach of stream that we were looking at, which is situated below the return flow areas from the Bostwick lands, the irrigation generates both tail water, which is measured by the District, as well as seepage return flows, and these would accrue to the draws, small tributaries and eventually to the Republican River itself.

Q. So are these return flows direct to the river through surface water source or are they alluvial recharge or both?

A. They're both.

Q. And have you calculated with regard to the alluvial recharge how long it takes for that water to reach the river system?

A. The assumption that we used in our report was that the return flows would generally be available very quickly because of the existence of the surface water system and the drains. So we did not do a calculation of the interaction between the farm lands and the Republican River groundwater aquifer.

Q. Do you generally know the characteristics of that aquifer?

A. Generally.

Q. Could you describe those?

A. Not other than to say it's probably a general river, sand and gravel aquifer, with much higher transmissivities and well pumping capacities than you would find in the upland areas which are typical of the lands in the Bostwick District. Those being the upland areas, so the transmissivities would be significantly higher and would allow for higher pumping capacities in the alluvium.

Q. Given those higher pumping capacities, I assume that that higher capacity exists also within KBID. Correct?

A. No, I don't believe so.

Q. So does the aquifer change characteristics downstream of KBID?

A. Yes. The lands serving -- the lands under KBID are not alluvial aquifer lands. Those are tighter soils. It's not really an aquifer.

Q. So given that, water applied to lands on KBID would not be recharging into an alluvial aquifer. Is that correct?

A. They generally are draining probably through the surface streams down to the Republican River.

Q. So there's, in your opinion, there's no groundwater recharge?

A. There would be some.

Q. Any idea how much?

A. No.

Q. And since groundwater -- strike that.

Since there's less transmissivity within KBID, when water is supplied to those lands, is it reasonable to assume that that water that's recharged reaches the river in the same year?

A. I thought that was reasonable because of the existence of the drain and surface streams coming out of that land down to the river.

Q. Are there any regulatory or other limitations on the amount of return flows in the surface water system? In other words, are there any requirements to reuse tail water or anything

like that in Kansas?

A. I can't speak generally for that kind of a requirement, but I'm not aware of that regulatory requirement in the Bostwick lands. I was not made aware of any specific requirement.

Q. Okay. Is it possible or did you analyze whether or not any pumping within KBID might have recaptured some of the recharge water that you estimated would reach the river?

A. I don't believe that would happen. The analysis that we make is based on the assumption that the pumping is not going to change either with or without condition, so with these additional flows served -- or with the additional water supplied to the KBID lands, that supply would not have generated additional pumping in the KBID lands or by any wells for that matter. If it had, then that would simply be unquantified impacts from those return flows, and would either be offsetting some of the increased diversions by surface users or would simply have made my analysis more conservative by not accounting for that. But the assumption was no additional pumping.

Q. Okay. With regard to the uses that are downstream of KBID, generally what are those uses?

A. They're primarily irrigation. There's also

some municipal use on the river. Several towns located between this area near the state line and Milford Reservoir, those are served primarily by wells. We concluded that the impact of rights would be surface water users. Those with pumps in the stream. I didn't do any specific investigation of sizes of those systems as to whether they were small acreage or large acreage system. My understanding is that it's primarily pumps in the streams, what I would consider to be fairly small systems, individual farmers pumping out of the stream.

Q. And how did you estimate those uses?

A. We tabulated the historical diversions for a category of water rights. The water rights that we selected to evaluate were water rights that are senior in appropriation to the MDS, minimum desirable stream flow dates. My understanding is that this reach of the river was under MDS administration for the predominant period of these two years at issue, so we limited our analysis to senior water rights and then we simply compared the amount of water that was diverted in this reach for these rights for the two years and compared that with potential diversions based on records.

Q. So you, as a matter of clarification,

you do not consider users junior to the MDS, the minimum desirable stream flow, to have been impacted?

A. We didn't for purpose of this analysis because of the, again, the administration that it is my understanding was in effect in this reach for these two years, and we also analyzed the additional water that would have been there to evaluate whether that would have put the stream flow up above the MDS level. If it had, then we would have considered that, but the amount of flow I calculated didn't increase the stream flow that much.

Q. Okay. So am I correct in understanding that the uses are catalogued essentially in Appendix D?

A. Yes.

Q. And how did you select which number to use for each of these users?

A. We didn't select a number for each individual user.

Q. Okay. In Appendix D?

A. Yes.

Q. There's a column labeled Max 1994 to 2004. Can you explain what that means?

A. That's the maximum amount of diversion for

that period for '94 through 2004 for annual diversion amounts, and so that's a maximum for each one of those water rights.

Q. And what's the relevance of that figure in your report?

A. I totaled those and then I compared the total to the amounts that were, again on a total basis, the amounts that were diverted in '05 and '06 and compared the total amount diverted for each of those years to the sum of the maximums, and then I took the difference between those as my estimate.

Q. So is it accurate to say that for purposes of this report, in order to determine the impact, you assumed that each of these users would use its historical maximum if water were available?

A. No, not necessarily.

Q. What did you use?

A. Well, the authorized quantity was also included on this table, so that there are differences between the amounts used and the authorized quantities as well, and so we didn't make an assumption for any individual water right. We were simply comparing totals.

Q. But you did not total the authorized

quantity, did you?

A. I did. That total is shown at the bottom of the table.

Q. Is that the amount that you assumed would have been used if all the water were available?

A. No, it's not.

Q. Which amount is that?

A. We used the maximum number.

Q. So the total in the column labeled Max 1994 to 2004?

A. Yes.

Q. Okay. So, for example, let's look at Right No. 32412, which is the last one in the second block row.

A. Yes.

Q. The maximum for that in 1994 to 2004 was what?

A. Seventy-five.

Q. And how much water was used in 2008 by that right?

A. I don't have 2008.

Q. I'm sorry, 2006.

A. Zero.

Q. And 2005?

A. Zero.
Q. And 2004?
A. Zero.
Q. And 2003?
A. Zero.
Q. And 2002?
A. Zero.
Q. And 2001?
A. Zero.
Q. And 2000?
A. Zero.
Q. And 1999?
A. Seventy-five.
Q. Okay. So did you conduct any analysis to determine the likelihood that this particular user would actually use 75 acre feet considering they had not used in the last six years?
A. No.
Q. Similarly, I would direct you to two rights above that, 51273. What is the max use there?
A. 393.9.
Q. Acre feet?
A. Yes.
Q. And how many times in the period that

you have used here was that amount used?

A. Just once.

Q. And is it accurate to say that that amount is about three times the normal use or the average use for those years?

A. Generally.

Q. And did you conduct any analysis to determine the likelihood that that individual would use three times the average use over that period of record?

A. No.

Q. I notice in that far right-hand column the authorized quantity fee for that particular user is 212 acre feet?

A. Yes.

Q. What does that mean?

A. Those are the authorized quantities for the corresponding water rights available to the owner of that water right.

Q. Does that mean under state law that individual cannot exceed 212 acre feet in use?

A. Yes. Depending on how water rights are grouped together on a property. I notice that there's three consecutive values with the same value. Those potentially could be water rights that are

operated together on a property. I notice there's a few instances of that, and it's possible that the diversions got reported under one structure or one water right ID relative to the user.

Q. Is it also possible that that user exceeded his authorized amount?

A. That's certainly possible.

Q. And if that were the case, the authorized user would not be entitled to call for that water under state law, I assume?

A. I'm sure they don't allow them to call for water above their authorized use. That's correct.

Q. And are you aware of any abandonment or forfeiture statutes in state law that result in the relinquishment of water rights for non-use?

A. Generally I'm familiar with that concept and how it is applied.

Q. Do you know what the statutory period is in Kansas?

A. No, I don't recall.

Q. Did you conduct any analysis to determine whether any of these rights might have run afoul of that?

A. Yes, I did. This list was provided to me with the representation that these were active and

valid water rights, not having been processed through an abandonment proceeding.

Q. By whom was this list provided?

A. I think generally Scott Ross. It was either him or somebody on his staff.

Q. And Mr. Ross made the representation that you just referenced?

A. Yes.

Q. Are there any non-consumptive uses that are included in this list?

A. These are irrigation water rights, so these are authorized quantities of use for irrigation, so my understanding is that no, there are not.

Q. So these are only irrigation water rights --

A. Yes.

Q. -- in Appendix D? All right. Do you attribute any impact to non-consumptive uses in your report?

A. No.

Q. I believe the report references the fact that there would be additional water available to flow into Milford Reservoir.

A. Yes.

Q. Under your analysis, what relevance does

Milford Reservoir have to your analysis?

A. Well, I'm just recognizing that there is a major storage facility with water rights, as well as contracted uses. It sits downstream of this reach of the river, and additional water generated in this reach is going to end up being stored in Milford Reservoir, and I think that's a significant point.

Q. Why so?

A. Because it provides additional water supply to the users or owners of Milford Reservoir.

Q. Who is that?

A. I'm not sure. It's -- they have a water bank and have set up a contracting mechanism through the state to allocate water out of Milford.

Q. Do you know where those water uses are located? Are they below Milford?

A. I believe all those uses are below Milford on the Republican and Kansas River.

Q. In your understanding of the compact, does that mean that those uses are outside of the Republican River Basin?

A. They may be. The Republican River Basin, in my view, probably extends to the confluence at Junction City.

Q. Did you conduct any analysis to

determine whether these uses had alternative water supplies available?

A. No.

Q. Did you happen to look at any USGS stream gauge data to determine the actual return flows available from KBID to the river?

A. Yes. We looked at the Concordia gauge.

Q. And what did that tell you?

A. Just generally that stream flows for this two year period were lower than normal, and that the additional water that I had calculated returning from the KBID system was not going to be sufficient to increase the flows to the MDS rate, which is measured at the Concordia gauge.

Q. Is there a gauge below, immediately below KBID's plant?

A. No, I don't believe so.

Q. Do you have any idea what the average stream gain is below KBID?

A. No, I don't.

Q. Did you earlier say that below KBID the system is generally alluvial, the aquifer?

A. Yes. On the river there's probably some drains and small streams between the KBID lands and the river that wouldn't have any significant aquifer,

so it's when you get down to the river, along the Republican River.

Q. So all of the uses that you looked at were surface water uses. Is that correct?

A. Yes.

Q. Did you conduct any analysis to determine whether groundwater wells might impact the volume of water returning to the system?

A. No, I did not. Again, I considered that issue with the assumption I described earlier, that wells would not increase the pumping because of any higher water table that would have resulted here. Whatever pumping occurred would have occurred.

Q. So your assumption is even though these individuals are experiencing a water shortage, they would not turn on their wells or increase pumping?

A. Well, they did pump their wells. And I want to be clear, we're talking about users below KBID lands.

Q. Correct.

A. So I think the question would be would there have been any physical constraints in their use to increase their pumping as a result of additional return flows, and I assumed not. Whatever pumping

occurred is what would have occurred.

Q. Wouldn't return flows comprise a normal component of the amount pumped, though?

A. It's possible that it could have. Again, that analysis would then lead to additional impacts on downstream well users, and I didn't feel confident enough that we would be able to substantiate that additional pumping was going to be part of the impact of this additional return flow, and so we assumed no additional pumping.

Q. Have you reviewed the report -- before I get there, let me ask you this. I believe your report assumes that irrigation efficiencies within KBID and outside of KBID are comparable. Is that accurate?

A. I don't recall a specific assumption that I had to make outside of KBID. Are you referring to a specific statement in the report?

Q. Well, I guess I would ask what did you assume for irrigation efficiencies below KBID?

A. I don't think I made that last step in the analysis. It wasn't necessary to quantify return flows from those users. Since we didn't add any value for the water flowing into Milford, I didn't take the next step and figure out how much return

flow would have been generated from these additional diversions. So the irrigation efficiency assumptions really stopped with KBID lands, the first use of the water.

Q. So you didn't conduct any analysis or make any assumptions about how water is distributed and utilized below KBID?

A. The information that I had was that these were small pump systems and probably on farm systems, so that the water was immediately available for application, you know, from the river to the lands.

Q. Have you reviewed the report of Mr. Golden and Mr. Kastens, et al., regarding the economic impact of this water loss?

A. I have read the report. I don't recall providing any substantive review on that, but.

Q. But am I correct in understanding that you provided the basic information regarding the water use data?

A. Yes.

Q. Are you aware that those individuals assumed efficiencies of 65 percent for flood irrigation and 90 percent for center pivot irrigation?

A. Yes. I would concur with those numbers.

Q. How does that relate to your 40 percent number that we talked about earlier?

A. The 40 percent number that I think we're referring to, and maybe I should ask you to clarify the 40 percent.

Q. This is on Page 5.

A. Yes. Those are two different things. We're describing on Page 5 the -- what I've been referring to as the system efficiency, which is the lateral and canal loss, so it's a difference between the amount of water at the state line in the canal and the amount of water that's delivered to the farm. The two figures you just referenced were on farm irrigation efficiencies.

Q. And what did you assume for on farm irrigation efficiencies in this document?

A. I don't think I specified in this report what figures we were using. We were using weighted efficiencies between center pivot and surface water irrigation gravity irrigation. I don't recall the specific figures since I didn't actually put the numbers in the report.

Q. Is it correct to say that those efficiencies would affect the amount of return flow?

A. Yes.
Q. In what way?
A. The higher the assumed efficiency, the lower the amount of return flow.
Q. So 90 percent efficiency for center pivot irrigation would result in a relatively low return flow?
A. Yes.
Q. And how much of the KBID irrigation is done through center pivot irrigation?
A. I don't have that number available in this report. I know there's a significant amount, but I don't remember the fraction.
Q. Did you conduct that evaluation, though?
A. Yes. We used the KBID records. I believe they have some records of their system uses as to whether it's sprinkler or gravity.
Q. Okay. Do you know what the RCA accounting calls for for efficiency rates, assumed efficiencies?
A. I don't recall. I wouldn't be surprised if they're different than 65 and 90, but I don't recall what they are.
Q. Okay. And could you tell me again how you derived those efficiencies, your efficiency?

A. We took a weighted average of the system type between gravity and sprinkler based on the information available from the District, and used values that we normally use for those two systems.

Q. Okay. Let's take a break right now. It's almost 10:00 and maybe we can reconvene -- it's 9:55. Let's reconvene at 10:05. Ten minutes.

(Brief recess taken.)

Q. (By Mr. Wilmoth) Mr. Book, I'm wondering if you could just help me understand the efficiency calculations a little bit better. I know you mentioned that you did not have a recollection of how you calculated the efficiencies or what exactly they were, but do you have a ball park estimate of what your efficiencies were in the -- as a result of your calculations? And to be clear, I'm talking about delivery efficiencies.

A. Yes. I thought you were. Probably the best way to describe it is on Table 1. There is a detailed system breakout for what was historical and what was model total.

Q. I'm sorry. Could you refer to -- which table?

A. I'm --

Q. Table 1?

A. Yeah, I'm in Exhibit 1, Table 1. And also, Table 2 is a summary of that. So what I provided on Table 1 and Table 2 are the results of the analysis, and if you would look under the modeled column in Table 1, you would be able to see what the total supply was with the additional -- or what we're referring to as the incremental supply added to the historical supply, and then you would see what the various elements of the losses are under each specific category corresponding to the types of record that's available from the KBID system.

I did not calculate percentages in this table, but the way I would look at these would be to compute what the model would numbers are, comparing the deliveries to the farm head gate deliveries. The farm head gate deliveries with the available water at the state line, and you can derive a percentage for whichever category, whether it's above Lovewell or below Lovewell or a system wide efficiency.

Q. So could you, for sake of example, derive an efficiency above Lovewell from this table? Do you need a calculator? I can locate one.

A. Well, if you look under 2006, for example, under Modeled.

Q. Uh-huh.

A. And the --

Q. This is on Table 1?

A. Yes, on Table 1. I have got a line item for Courtland Canal loss above Lovewell Reservoir. You could express that as a percentage of the Courtland Canal at the Nebraska-Kansas State line. Then when you go down into the analysis, into the laterals, you have got the amount of water converted into the laterals, and then you have got the lateral waste and the lateral loss listed there, so you could sum those two numbers and divide those by the upper lateral diversion. That's the amount going into the laterals. So that number is 1,800 plus 5,400 divided by 18,000.

Q. Do you need a calculator for that?

A. Oh, sure. I have got one.

Q. And I guess before you proceed too far with that, I want to be sure we're all talking about the same thing. What I'm trying to figure out from your tables is the efficiency between the canal and the on farm delivery. What amount and what's diverted was actually delivered at the head

gate.

A. Yes.

Q. Okay.

A. Yes. That's the way I'm defining it, also, here, so this table allows you to compare the amounts at the upper end of each element and compare that to the farm deliveries, so the total, for example, the lateral loss was 40 percent, and if you would look at the Figure 3 shows the values we use for the lateral loss. Figure 3 shows the lateral loss above Lovewell and it shows 30 percent for the seepage -- excuse me, 30 percent for the loss and 10 percent for the waste. Those are the two items that the Bureau records break it down into, so the total loss for above Lovewell on laterals is 30 plus 10 is 40 percent, meaning an efficiency of 60 percent in the laterals, and that corresponds with the calculation I just did for you with respect to the laterals.

If you wanted to calculate it for the canal loss, you would have to take the total flowing into the canal, subtract out the lateral deliveries, the farm deliveries and the delivery to Lovewell Reservoir and compare that to the total coming into the Courtland, so there would be several steps in that calculation. The values that we used for canal

losses are a function of the amount of water diverted, and those show up on Figure 2 for above Lovewell and Figure 4 for below Lovewell. So the seasonal results that I calculated plot on the curves on Figure 2 and Figure 4, depending on where the water supply is at for those two years.

Q. So going back to Figure 3.

A. Yes.

Q. Essentially, if you have got 40 percent losses, you have got a 60 percent efficiency, roughly?

A. Yes.

Q. I'm going to give you exhibit, is it 7?

(Whereupon, Book Deposition Exhibit Number 7 was marked for identification by the reporter.)

THE WITNESS: Excuse me. Could I just supplement my answer one more time?

Q. (By Mr. Wilmoth) Certainly.

A. To just give you an overview on the system efficiency, which is -- it's a composite including above, below and Lovewell Reservoir, if you just take the 34,985 and divide that by the 59,901, that will give you an overall system loss of about 32 percent -- 42 percent, excuse me.

Q. Okay. I handed you what's Exhibit 7, and I would like you to take a moment and familiarize yourself with this document. And when you have had a chance to, if you could identify it for us.

A. Yes. This is a transmittal of some data from George Austin to several people, and appears to be a tabulation of data from the Bureau of Reclamation, which describes or documents nine years of deliveries above and below Lovewell Reservoir as well as the acreage.

Q. Thank you. And there's a table attached to this on Page 2.

A. Yes.

Q. And the title of that table is what?

A. Kansas Bostwick Operations from BOR Table 2. At least that's the title on the top part.

Q. That's what I'm referring to. And in the right-hand column there are some percentages of farm delivery of diversion. Do you see that?

A. Yes.

Q. And just to be clear, is that basically the same thing we're talking about that results in a 60 percent efficiency through your calculations?

A. It's not clear to me on this table where the

category called canal delivery is coming from. Those appear to be inches, and I don't -- there are numbers at the bottom of this table which have totals for canal diversion above Lovewell and below Lovewell which you could translate into inches. That may have been what was done here.

Q. And in the far right column, Percent Farm Delivery of Diversion, you see that?

A. Yes.

Q. What does that figure mean to you?

A. That appears to be the ratio between the farm delivery and the canal delivery.

Q. And that's the same ratio I was asking you to calculate earlier?

A. It would depend on how canal delivery is defined. If the canal delivery was separated between above and below Lovewell, then you may get different answers or that may be a different element than what I described to you which is based on the physical flow in the above Lovewell. Sometimes these records break out the state line flow depending on whether it was delivered to above or below Lovewell, and that would give you one calculation of efficiency. I have got a physical calculation here which looks at all the water in the above Lovewell part of the canal, so

that part could be a little different.

Q. By how much?

A. I'm not sure.

Q. But regardless of how the canal delivery was calculated, at the end of the day the on farm efficiency, or I'm sorry, the percent farm delivery of diversion efficiency is a number depending on how you get at it. Right?

A. Yes.

Q. And so the number that is calculated, the average for '97 to 2001 is what on this table, above Lovewell?

A. 48.89 percent.

Q. And that's an average based on '97 to 2001. Is that correct?

A. Yes.

Q. Do you have any opinion as to how the hydrologic circumstances of that period compared to 2005 and 2006? Was it wet or dryer or normal?

A. Well, in terms of the water supply in the canal, '97 to 01 would have been a better water supply as indicated by the amounts of farm delivery, as well as the diversions in '05 and '06 were much less than that in terms of the amount of water being delivered through the system as it actually occurred.

Q. And as a general rule, during wetter periods are efficiencies higher or lower?

A. The efficiency that we're talking about, which is the canal loss, is not a function of wetter or dryer. It's a function of how much water is being handled or delivered through the system.

Q. But in a wetter year, typically more water flows through the system?

A. Well, not necessarily. It's -- it probably peaks at something less than wetter. As the precipitation increases, the amount of water delivered through the system is going to start to decline, so when you're categorizing a year as wet or dry, I assume you're describing precipitation conditions which would be different than water supply conditions, which would be a function of the crop demand and the supply in the reservoir.

Q. So in 2005 and 2006, which you have mentioned were dryer years than '97 to 2001? Is that correct? 1997 to 2001 were generally wetter than 2005 and 2006. Is that correct?

A. I don't know that I compared the precipitation for those periods.

Q. Okay.

A. So again, wetter, dryer is precipitation.

The water supply was clearly higher in '97 to '01 than in '05 and '06.

Q. But you have no opinion as to how much additional water was diverted during that period, vis-a-vis '05 and '06?

A. Yes.

Q. Was more water diverted in that period than '05 and '06?

A. Yes.

Q. So there was more water in the system during that period than in '05 and '06?

A. Yes.

Q. So getting back to your relevant point, the more water in the system, the better the efficiencies?

A. Yes.

Q. So efficiencies in '97 to 2001 theoretically would be better than in '05 and '06?

A. Not for purposes of this analysis.

Q. Why is that?

A. Because we're analyzing how the system would have operated with a water supply that's somewhat comparable to the '97 to '01 water supply in terms of quantities of water available and delivered.

Q. Okay. So would you not expect that the

efficiencies would be similar to '97 to '01?

A. Yes. That was the way I did my analysis.

Q. But your analysis includes an efficiency upwards of 60 percent and this analysis concludes 48.49 percent.

A. If that's what that number is. I'm not sure what the above Lowell and the below Lovewell, how those two numbers compare. I notice he has got 60 percent for below Lovewell, and if you took some weighted number, you might end up at 57.

Q. And what did you compute? Did you distinguish between above and below Lovewell?

A. Yes. That was -- that goes back to Table 1. I have got -- I have got losses calculated for each of the two systems above and below.

Q. So what efficiencies did you calculate or could you calculate for me right now?

A. With respect to each?

Q. Above and below Lovewell, generally. I don't need all the subcomponents. I'm just seeking that overall number.

A. I have got a loss in the above Lovewell section between the state line and deliveries to Lovewell in the laterals -- excuse me, in the farms of 76 percent of efficiency, which means the canal

loss and that reaches 24 percent.

Q. I'm sorry, that's above Lovewell?

A. That's above Lovewell, yes.

Q. Okay.

A. That's for the year 2005. I have got another 8 percent loss in Lovewell. I'll calculate the downstream. My efficiency below Lovewell for the year 2005 is 54 percent, which is the 23,094 plus the 383 acre feet divided by the 42,672 released out of Lovewell.

Q. So to recap, in 2005 your above Lovewell is 76 percent efficiency and below is 54 percent efficiency?

A. Yes. And there is an additional loss for Lovewell Reservoir in there, too, which doesn't have a corresponding figure on this exhibit.

Q. Okay. And just to come full circle on this, that efficiency number affects the ultimate conclusions in your report in what way?

A. My purpose is to calculate the amount of water delivered to the farms. So the higher the efficiency, the more water that would be delivered to the farms with a given water supply at the state line.

Q. So the lower the efficiency, the less

water would be delivered?

A. Yes.

Q. Have you had occasion to review this report entitled Review of the 20 January, 2009 Report prepared by Spronk Water Engineers, Inc. for the state of Kansas by The Flatwater Group? You're welcome to review it. I don't want to mark it as an exhibit if you haven't read it.

A. I have read parts of it, but not significantly.

(Whereupon, Book Deposition Exhibit Number 8 was marked for identification by the reporter.)

Q. (By Mr. Wilmoth) I'm going to go ahead and give this as Exhibit 8. I would just like to ask you, and I'll certainly get you a copy in one minute, but without any specifics, I would just like to hear your opinions of that report.

A. I have one with me, if I can look at it.

Q. Of course. Of course.

A. Well, my understanding based upon what I know about this report so far is that there are a couple of significant differences between the results that were calculated in this report and my results. I'll just enumerate those as I'm aware of them at

this point in time, subject to additional review by me between now and the hearing.

Q. Sure.

A. But I understand the first point of difference is that the Harlan County Reservoir for 2006 has been allocated entirely to the state of Kansas, which would result in a different number for the overuse of the state of Nebraska, somewhere on the order of 71,000 acre feet compared to the 79,000 number that we are using. The second difference relates to the --

Q. Before you -- before you proceed on that, do you have any reason to doubt the accuracy of that number if the allocation were changed?

A. My understanding is that that number assumes all of the evaporation for 2006 is allocated to the state of Kansas. I don't know how the additional evaporation was allocated or if there was any issue taken with that, so I don't have any reason. I understand that Mr. Groff found the same differences in the accounting that we found. One was the gross evaporation. The other one, I was told that his difference was the same number we had had.

Q. Okay. Sorry. Go ahead. Proceed.

A. The second issue involves the -- how you

factor in the physical seepage loss between the Guide Rock diversion dam and the state line on the Courtland Canal, or maybe a better way to state the difference is what you consider to have been diverted at the river head gate. I didn't have a river head gate diversion in my report, but I understand that this report charged all of the physical canal loss between the river and the state line against the Kansas allocation, so that would be a significant difference from my report.

Q. Do you have an opinion about whether that should be done or should not be done?

A. That should not be done. I was measuring the delivery to the state of Kansas at the state line in the Courtland Canal, and the only part that would be charged to the allocation is the consumptive use part of the canal loss.

Q. That's your interpretation of the compact. Is that what's that's based on?

A. No. That's based on my review of the accounting and the way that the accounting spreadsheets are set up and the way that consumptive use gets charged to the state of Kansas. It's consumption in Nebraska, but it's consumption that is allocated to the state of Kansas, meaning not to the

state of Nebraska.

Q. And if that were allocated in the way that The Flatwater Group did so, do you have any reason to doubt the accuracy of the number that they derived?

A. I haven't reviewed the actual derivation of that number to see if it's consistent with my canal loss or not.

Q. Any other differences?

A. Yes. The third thing is the -- what I think are significantly higher transit losses or canal and lateral losses in the system. I just did a quick back of the envelope calculation, and it looked like there was an efficiency for the system of about 30 percent doing an apples and apples comparison with my analysis. I'm not firm on that number, but it was enough to be significantly lower efficiency than mine, which I would attribute to applying low water supply year efficiencies to a system that would have enough water in it to run as a normal year water supply.

The fourth difference I noticed is a change in the assumption for how much water is diverted by the water rights downstream of the KBID on the Republican River and the tributaries down there. It

looked like a calculation was made to simply change my use of the maximum annual diversion to the average annual diversion, and that's all I know about that calculation at this point.

Q. In your experience, do you typically use a maximum or annual diversion to determine the projected water use?

A. Well, it depends on what you're analyzing. In this case we're trying to analyze how much additional water would have been diverted, water that was not in the system, but how much would have been diverted or could have been diverted by the water users below KBID.

Q. And there's a distinction between what would have been diverted and what could have been diverted. Correct?

A. That distinction is very difficult to make in this type of an analysis.

Q. On what do you base your apparent view that all water that could have been diverted would have been diverted?

A. I don't -- I don't view my analysis as all of the water that could have been diverted. I compared the amount of the water rights to the diversions and used the maximum diversions as

representative of what could have been diverted.

Q. And on what do you base your opinion that these individuals would exercise their right to the maximum possible amount?

A. I did not assume that. The number I used does not go up to the total of the water rights. It goes up to the maximum diverted in the period, so it stopped short of going to a full water right assumption.

Q. On what do you base your assumption that they would divert the maximum historical amount that they had diverted?

A. That the water was there -- would have been there and could have been diverted. The only additional physical condition that was there for these two years that was unique was the existence of the MDS administration, which would make these types of water rights much more valuable in terms of their yield, vis-a-vis, other water sources of the farm.

Q. And earlier in the deposition I believe you saw -- Exhibits 2 and 3 were information from Mr. Nelson explaining that some precipitation had arrived in July of '05. Do you recall those?

A. Yes.

Q. How would that affect the situation?

A. Well, as you pointed out, these may not have been the driest of years in terms of precipitation. I generally think of '02 and '03 as dryer years precipitation wise. Certainly the condition of the river was not very good by '05 and '06 because stream flows had been down going back to at least '01. So the condition of the river would have some effect on the demand for water, and then the other point I made is that the existence of the MDS administration in this reach of the river would make these types of water rights more valuable in terms of their water supply.

Q. But if significant rains were falling and precipitation was good in July of 2005, would it be reasonable for an irrigator to use the maximum historical volume is used or would you not accommodate for that rainfall?

A. Yes. Certainly the water use is going to be related to the amount of rainfall, and depending on when it rains and how much it rains, that would affect your diversion.

Q. So what other differences have you identified between your report and The Flatwater Group report?

A. That's all I have identified so far.

Q. I think that takes us to about our conclusion point. Let me just consult.

(Off-the-record discussion.)

MR. WILMOTH: John, I'm finished and it doesn't sound like Colorado has anything. If you would like to redirect, you may.

MR. DRAPER: No redirect.

MR. WILMOTH: I believe that concludes Mr. Book.

(Witness excused.)

_____ .
DALE E. BOOK, P.E.

STATE OF _____)
) SS:
COUNTY OF _____)

Subscribed and sworn to before me this____ day of _____, 2009.

_____.
NOTARY PUBLIC

My Commission Expires: _____.

In re: Non-Binding Arbitration

C E R T I F I C A T E

I, JANE A. BLACKERBY, a Certified Court Reporter within and for the State of Missouri, hereby certify that the within-named witness was first duly sworn to testify the truth, and that the deposition by said witness was given in response to the questions propounded, as herein set forth, was first taken in machine shorthand by me and afterwards reduced to writing under my direction and supervision, and is a true and correct record of the testimony given by the witness.

I further certify that I am not a relative or employee or attorney or counsel of any of the parties, or relative or employee of such attorneys or counsel, or financially interested in the action.

WITNESS my hand and official seal at Kansas City, Jackson County, Missouri, this 28th day of February, 2009.

_____

JANE A. BLACKERBY, RPR, CCR No. 877

Certified Court Reporter